

EXHIBIT 6

Dec. 26, 1967

R. W. SPEISER ET AL

3,359,661

POWERED IMPLEMENT

Filed June 30, 1964

2 Sheets-Sheet 1

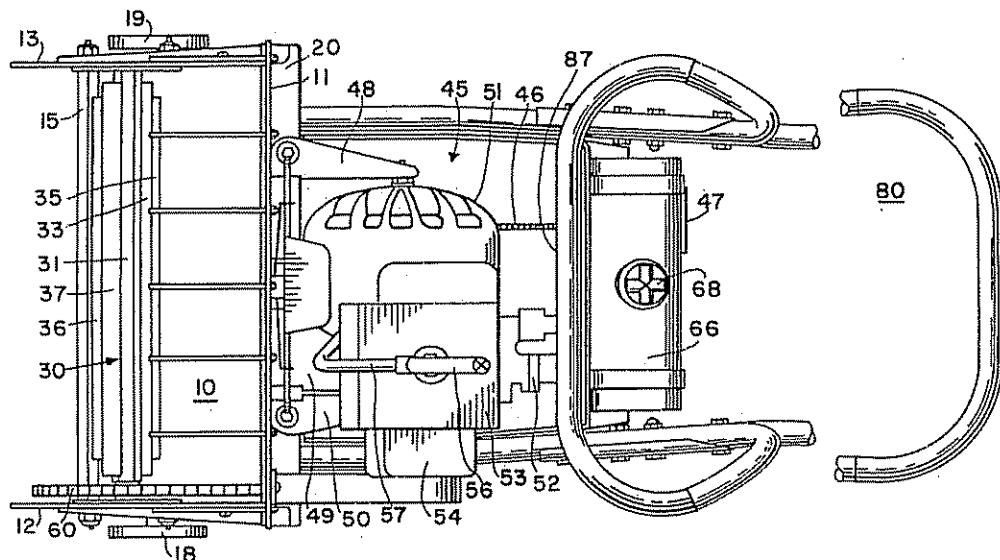


Fig. 1

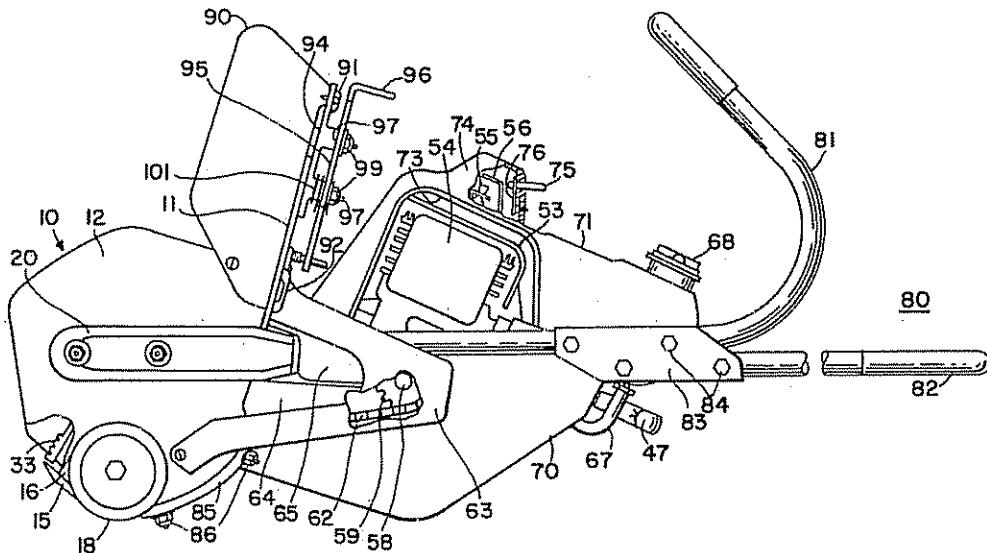


Fig. 2

INVENTORS
RALPH W. SPEISER
WILLIAM C. LINDQUIST
HERBERT F. HORNER JR.

BY *Vernon A. Johnson*

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2 Sheets-Sheet 2

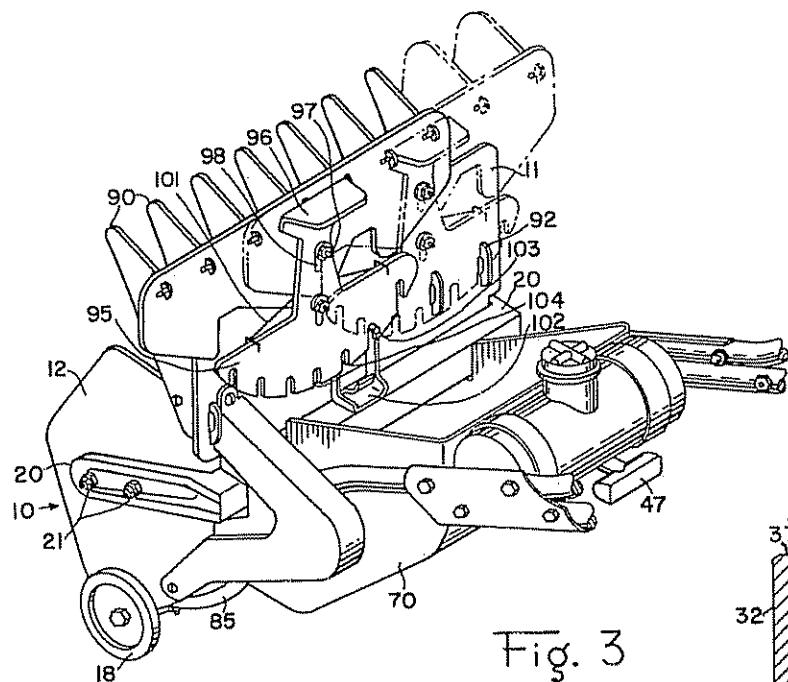


Fig. 3

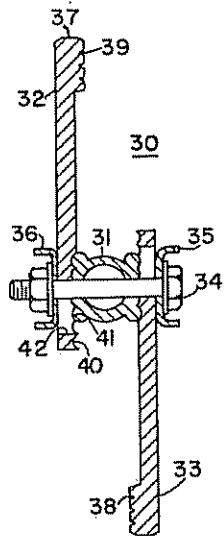


Fig. 5

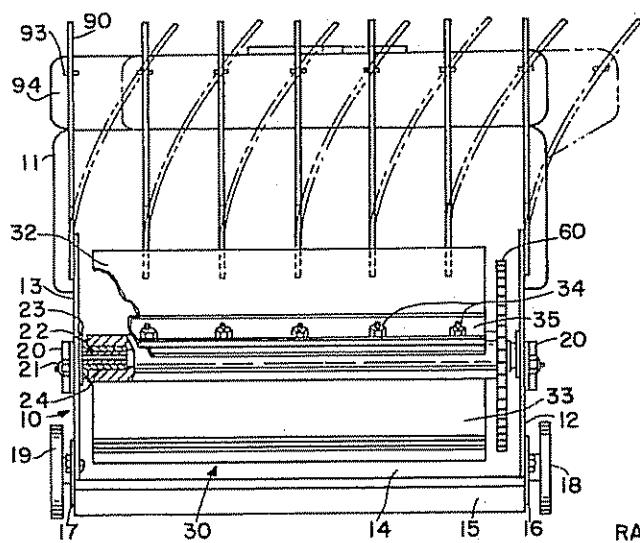


Fig. 4

INVENTORS
RALPH W. SPEISER
WILLIAM C. LINDQUIST
HERBERT F. HORNER JR.

BY *Vernon A. Johnson*

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3,359,661

POWERED IMPLEMENT

Ralph W. Speiser, William C. Lindquist, and Herbert F. Horner, Jr., Minneapolis, Minn., assignors to Toro Manufacturing Corporation, Minneapolis, Minn., a corporation of Minnesota

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41 Claims. (Cl. 37—43)

This invention pertains to powered snow removal equipment, and more specifically, to a motor-powered device wherein a rotating blade member is effective for readily impelling snow considerable distances from the plow.

Snow plows presently in wide spread use by homeowners, for use in cleaning snow from sidewalk and driveway areas, are conventionally provided with a power driven rotating member that augers the snow from both of its ends toward the center, and the snow is impelled upwardly from that central area through a directionally controllable discharge chute. A typical device of this type is shown in United States Patent No. 3,078,603, and as is usually the case, includes a wheeled frame, and a relatively heavy engine. Thus, plows of this type tend to be quite heavy and expensive. Furthermore, when the snow is relatively wet, the discharge chute tends to clog and thereby interrupt the plowing activity.

It is, therefore, an object of this invention to provide a new type of lightweight and inexpensive snow plow, especially suited to use by a homeowner, wherein clogging is substantially eliminated by use of an impeller in the form of a paddle which impels the snow through a plurality of directionally controllable flexible vanes.

This and other objects and advantages of the invention will more fully appear from the following description made in connection with the accompanying drawings wherein like character references refer to the same parts throughout the several views, and in which:

FIGURE 1 is a top plan view of the plow, with a portion of the handle broken away.

FIGURE 2 is a side elevation corresponding to the view shown in FIGURE 1.

FIGURE 3 is a perspective view taken from the left rear corner, and with the motor removed.

FIGURE 4 is a front view of the plow, wherein the flexibility of the discharge-vanes is shown in dotted lines, and

FIGURE 5 is a cross section view of the snow impeller.

Our improved snow plow includes a rotor housing 10, which may be formed in metal, linear polyethylene, or any suitable material. Housing 10 has an upstanding backwall portion 11, left and right side portions 12 and 13, respectively, and a bottom portion 14, integrally formed as shown. Bottom portion 14 has an arcuate cross section and forms a continuous surface or moldboard with backwall portion 11 for directing the snow upwardly from between the side portions 12 and 13, and into the discharge-vanes 90, under the influence of the rotating paddle assembly 30. Side portions 12 and 13 are held in fixed spaced relation by skid 15 and U-shaped bracket 20, as shown. Skid 15 is positioned across the lower portion of housing 10, and is bolted to sides 12 and 13 by means of wheel support plates 16 and 17, which are rigidly attached to skid 15. Small wheels 18 and 19 are rotatably mounted to wheel support plates 16 and 17, respectively, as shown. The upper surface of skid 15 is positioned so as to provide a smooth continuous surface with bottom portion 14 of housing 10.

U-shaped bracket 20 provides additional support for housing 10, being positioned against the outer surfaces of side portions 12 and 13, and backwall portion 11, as

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shown. Bracket 20 is bolted at its extremities to housing 10 by means of bolts 21, and provides a solid support for paddle 30. This support is best seen in FIGURE 4, wherein a portion of the right end of paddle 30 is broken away and the bearing assembly is shown in cross section. Stud 22 is rigidly attached to plate 23, which is in turn bolted through side portion 12 to bracket 20 by means of bolts 21. A bushing 24 having a flange at its outer end is rotatably positioned on stud 22, and is pressed into the end of shaft 31 of paddle assembly 30 as shown. Thus, paddle assembly 30 freely rotates between the side portions 12 and 13 of housing 10.

Paddle assembly 30 consists of two paddles 32 and 33 mounted on a shaft 31 by means of a plurality of bolts 34 and U-shaped re-enforcing brackets 35 and 36 as is most clearly seen in FIGURE 5. A sprocket 50 is rigidly attached at the right end of the assembly as seen in FIGURES 1 and 4.

Paddles 32 and 33 are preferably formed from linear polyethylene, and are somewhat enlarged along the outer end as shown at 37, and 38, respectively. The inner edge of each paddle is formed with a plurality of spaced parallel grooves 40, which engage the complementary spaced parallel ridges 41 formed on the opposite sides of shaft 31 as shown. In operation, the outer edges of the paddles often scrape against the sidewalk or other surface on which the plow is used, causing a wearing away of the edges of each paddle. When the operator observes that the edge has worn down a predetermined amount as indicated by the grooves at the outer edge, e.g., when the paddle 32 wears down to groove 39, the bolts 34 can be loosened and the paddles can then be moved outwardly until grooves 40 are in alignment with the next set of ridges, thereby lengthening each paddle to compensate for the wearing that has occurred. The bolts 34 are then retightened and the lengthwise grooves and ridges 40 and 41 effectively prevent paddles 32 and 33 from turning with respect to shaft 31, even though bolts 34 pass through relatively long slots 42 in each paddle. It will be observed that this arrangement permits several successive adjustments of the blade as the wearing proceeds inwardly on each paddle. Eventually, enlarged portions 37 and 38 will be fully worn away, and the paddles should then be replaced. However, in the interim, consistently good plowing can be achieved by the simple blade adjustments as described. It is, of course, very desirable to maintain the outer edges of said paddle in close proximity with the curved portion of said housing, and excellent results are achieved when there is a slight wiping contact.

A gasoline engine or motor 45, which includes a recoil starter operated by rope 46 and handle 47, is rigidly attached to bracket 20 by means of motor support brackets 48, 49 and 50 as shown. The motor is of a conventional, horizontal shaft design including a housing 51, a carburetor and governor assembly 52, an integral cover 53 formed over its single cylinder (not shown), a muffler 54, a spark plug 55, a spark plug shorting strap 56, an ignition wire 57, and an output shaft 58. A sprocket 59 is attached to shaft 58, and driven sprocket 60 attached to shaft 31 is driven by means of chain 62, which extends through openings (not shown) in the backwall portion of housing 10. We have not found it necessary to provide a clutch on this device, but it should be understood that a clutch could be provided to permit starting the engine without load, rather than providing a direct chain drive as shown.

Chain 62 is provided with a guard 63, shaped as shown and bolted to the housing 10 as is best seen in FIGURE 3. Guard 63 is formed with inner flanges 64 and 65 as shown, as added protection against snow getting onto motor 45. However, it will be noted that no guard is provided for chain 62 within housing 10, since we have

found such a guard to be unnecessary during operation.

Motor 45 is enclosed by means of two additional housing members 70 and 71. Bottom member 70 is in the form of a shallow basket, which fully encloses the underside of motor 45, and it serves as a skid during operation. The forward portion of housing member 70 is bolted to housing 10, and the upper rear portion of member 70 is secured to one of the handle assembly bolts 84 on either side of the machine. A gas tank 66 is fastened to the upper rear portion of member 70, and gas line 67 extends through the backwall of member 70 to motor 45.

The exposed top area of motor 45 is enclosed by cover member or shroud 71, which has a rear opening (not shown) for gas tank fill tube 68, and a side opening 73 for muffler 54, said opening 73 being re-enforced by forming the perimeter of the opening into an outwardly extending flange. A small opening in the top cavity 74 is provided for pin 75, to permit the operator to push the shorting strap 56 against spark plug 55 without removing cover 71. Pin 75 is attached to a spring member 76, which is in turn fastened to cover 71, and the operator merely pushes the pin into engagement with strap 56 in order to force it against spark plug 55, whereafter strap 76 restores pin 75 to the position as shown.

Handle assembly 80 consists of a forward handle 81, a rear handle 82, a pair of handle assembly brackets 83, and a plurality of handle assembly bolts 84. The forward handle 81 is shaped as shown with its forward ends bent downwardly on either side of the machine (behind guard 63 in FIGURE 2), and terminating to the rear of skid 15 with a forwardly curved portion 85 at each end which wraps around a portion of housing 10. Bolts 86 are used to attach the handle 81 directly to housing 10. Rear handle 82 extends directly rearwardly from brackets 83 as shown. In operation, a right-handed operator may grip handle 81 in his left hand, and the handle grip area 87 is positioned with respect to the center of gravity such that plow assumes a proper plowing attitude when lifted by means of handle 81. The right hand could then be used to grip handle 82, to permit swinging the plow back and forth in somewhat the same manner as a conventional snow shovel. Alternatively, the operator may wish to push the plow ahead of himself with both hands on handle 82, and wheels 18 and 19 resting on the surface to be plowed.

It will be noted that the point of attachment of handle 81 to housing 10 is spaced away from the point of attachment of the U-shaped engine support bracket 20, and since linear polyethylene is used for housing 10, there is a substantial dampening of the engine vibration so as to minimize vibration in handles 81 and 82. The handle also facilitates storage, since the plow can be conveniently hung up on a wall by means of handle 82. In this connection, it should also be noted that side portions 12 and 13 have been formed with a substantially straight portion to facilitate standing the plow against a wall or in some other out-of-the-way place with handle 82 substantially vertical.

The discharge of snow from our plow is accomplished by means of a group of highly flexible vanes 90 attached to housing 10. Each vane is shaped as is most clearly seen in FIGURE 2, to include mounting tabs 91 and 92 at either end as shown.

Each of the lower tabs 92 is formed with a detent which holds the vane in position when tab 92 is pushed through an elongate slot in housing 10. The short key tab 91 at the upper end of each vane fits loosely into a horizontal slot 93 in vane mount 94. Thus, as vane mount 94 is moved laterally as shown in dotted lines in FIGURE 4, the top of each vane is correspondingly flexed to one side, while the bottom of the vane is held in a fixed position by elongate lower tab 92. Thus, a plurality of channels is provided between the several vanes to deflect the snow as desired.

The extent of flexing, and the direction thereof, is controlled by selector plate 95, which has a handle portion 96 at its upper end. Selector plate 95 is slidably mounted to vane mount 94 by means of two pins 97 formed as an integral part of vane mount 94, which extend through vertical slots 98 in selector plate 95 as shown. Nuts 99 hold plate 95 on pins 97, but permit sliding motion with respect thereto. A spring 101 on the lower pin 97 engages the outer extremities of selector plate 95 as shown, and urges plate 95 downwardly on pins 97 as is shown in FIGURE 3.

The positioning of vanes 90 is accomplished by means of a central bracket 102 attached to U-shaped bracket 20, and a horizontal pin 103 rigidly attached to bracket 102, bracket 102 being also attached to backwall portion 11 of housing 10 so as to add rigidity thereto. Pin 103 cooperates with grooves 104 in selector plate 95 as is best seen in FIGURE 3.

Thus, pin 103 engages a slot 104 in plate 95, and spring 101 prevents plate 95 from moving out of engagement with pin 103, and pin 103 therefore holds the vanes 90 in the selected position. In FIGURE 3, we have shown the vanes deflected to the left, and if the operator desires to throw the snow to the right, he merely lifts upwardly on handle 96 to disengage pin 103 from plate 95, and then moves the entire selector plate and vane mount assembly laterally as is shown in dotted lines until pin 103 is in alignment with the desired slot 104, and then releases handle 96. Thereafter, pin 103 holds the selector plate 95 in the desired new position until the operator again makes a change.

In operation, the operator normally lifts handle 81 or 82, or both, until the bottom surface of skid 15 is substantially parallel with the surface to be plowed, and it will be noted that the backwall portion 11 of housing 10 is then tipped approximately 20 degrees forwardly of vertical as viewed from the side of the machine. The operator then adjusts vanes 90 to the desired attitude by means of the selector plate, and—assuming the engine has been started—the plow is then pushed into the fallen snow. The paddles 32 and 33 rapidly impel successive quantities of snow backward and upward along the bottom 14 and back 11 walls of housing 10, and the forward attitude of wall 11, combined with the selected displacement of vanes 90, causes the snow to be impelled in the desired direction to some distance away from the plow. The fact that channels between adjacent vanes 90 are open at the front, combined with the flexibility of the vanes, tends to substantially minimize clogging, even in wet snow. Furthermore, the fact that the paddles are slightly offset from radial since they are mounted on the sides of shaft 31, results in a force component tending to slightly compact the snow against the moldboard and thereby accelerate the snow through the vanes.

We have found it possible to construct this plow using very lightweight and inexpensive components and materials, and thereby produce a machine that is convenient to use, and much less costly than contemporary home-owner plows. For example, we prefer to use linear polyethylene for the paddles 32 and 33, vanes 90, vane mount 94, selector plate 95, and for housings 10, 70 and 71. Furthermore, by using tubular aluminum for the handles, an aluminum skid, and a lightweight engine, an overall weight of less than 25 pounds, in a machine that plows a swath approximately 14 inches wide, has been achieved. We have also found that the machine has excellent durability, and that performance is comparable or better than the prior art plows of equivalent width.

The plow works well as compared with contemporary plows because there is a minimum of snow compaction, a minimum change of direction of the snow as it is plowed, and a minimum of containment due to the open front and exposed vanes. Furthermore, linear polyethylene has a low coefficient of friction. Another factor is the flexibility of the paddles, which are straight statically but which

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free-form to a natural backward curve dynamically, and therefore readily unload snow and are difficult to overload. These factors contribute to a conservation of energy, resulting in greater efficiency.

Thus, it will be seen that we have provided a novel and improved snow plow which, while being of simple and inexpensive construction, functions in a more efficient manner than any heretofore known comparable device.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departing from the scope of our invention.

What we claim is:

1. An impeller for a snow plow comprising:
a rotatable shaft member formed so as to provide a substantially flat surface along the length of said shaft, having a plurality of elongate, parallel, and adjacent ridges formed therein,
an elongate paddle member having a plurality of grooves adjacent its inner edges which are complementary with said ridges, and
fastening means for selectively holding certain of said ridges in engagement with certain of said grooves to thereby fix the radial length of said impeller.
2. An impeller for a snow plow as claimed in claim 1, wherein said paddle is formed with a plurality of lengthwise indices at its outer edge which are spaced equally to the spacing between said grooves
3. An impeller for a snow plow claimed in claim 1, wherein said shaft is formed to provide a plurality of additional corresponding ridges in diametrically opposed relation to said first mentioned ridges, and additionally comprising:
a second elongate paddle member having a plurality of grooves adjacent its inner edge which are complementary with said additional ridges, said fastening means being effective to simultaneously hold said first and second paddles in selected and opposed positions with respect to said shaft, to thereby balance said impeller.
4. A snow plow comprising:
an upstanding rear wall disposed generally transversely of the normal direction of travel,
impeller means mounted forwardly of said wall for throwing snow upwardly along the front face of said wall, and
a plurality of generally upstanding horizontally spaced flexible vanes extending forwardly of said wall and defining chute means for receiving and directing the snow thrown upwardly by said impeller means away from said plow,
and means for laterally deflecting said vanes comprising an elongate longitudinally shiftable transversely disposed member adapted to change the angle of deflection of said vanes in response to longitudinal shifting movement of said member, and means for longitudinally shifting said member and holding same in a plurality of predetermined positions comprising an element operatively attached to said member and vertically shiftable relative thereto and adapted for transverse movement simultaneously with longitudinal shifting movement of said member, and means for releasably holding said element in a plurality of positions corresponding to said predetermined positions.
5. A snow plow comprising:
an upstanding wall disposed generally transversely of the normal direction of travel,
impeller means mounted forwardly of said wall for throwing snow upwardly along the front face of said wall,
a plurality of horizontally spaced vanes for receiving and directing the snow thrown upwardly by said impeller means away from said plow,

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and control means for selectively varying the vertical attitude of said vanes,
said control means including a holding member operatively connected with said vanes and capable of lateral and vertical movement,
the attitude of said vanes being varied in response to said lateral movement of said member,
and means for retaining said member in a plurality of lateral positions,
said member being released from said retaining means by vertical movement of said member in one direction and moved into engagement therewith by vertical movement in the opposite direction.

6. The snow plow of claim 5, wherein said holding member includes a manually grippable handle member for effecting said movement of said member.

7. A snow plow according to claim 5, including means biasing said holding member towards engagement with said retaining means.

8. A snow plow according to claim 5, wherein said retaining means includes first means providing a plurality of laterally spaced openings and second means providing an element engageable with said openings and holding said holding member against lateral movement when so engaged, one of said first-second means being fixed, the other being connected with said holding member.

9. The snow plow of claim 8, wherein said first means is connected with said holding member.

10. The snow plow of claim 8, wherein said openings are formed on an arcuate edge.

11. The snow plow of claim 8, wherein said holding member has a downwardly directed convexly curved edge portion, and said openings are formed in said curved edge portion.

12. The snow plow of claim 5, including:
a manually grippable handle member formed on said holding member for effecting movement of said holding member,

said holding member having an arcuate transversely oriented edge portion, said retaining means including a plurality of laterally spaced openings formed therein,
a fixed stop member for selectively engaging said openings and holding said member in selected operating positions,
and means biasing said arcuate edge of said holding member towards and holding said openings thereof in engagement with, said stop member.

13. The snow plow of claim 12, wherein said control means includes

a transversely disposed vane shifting member connected to said vanes and said holding member,
said shifting member being transversely shiftable and adapted to vary the deflecting attitude of said vanes in response to said shifting,
said holding member being transversely moveable simultaneously with said shifting member and vertically shiftable relative thereto.

14. A snow plow comprising:
an upstanding wall disposed generally transversely of the direction of travel,
impeller means mounted forwardly of said wall for throwing snow upwardly along the front face of said wall,

a plurality of horizontally spaced vanes for receiving and directing the snow thrown upwardly by said impeller means away from said plow,
supporting structure on the plow supporting said vanes, and
attachment means for mounting said vanes on said supporting structure,
said attachment means comprising a slot in said supporting structure and a detent carried by the vane, said detent being insertable through said slot and

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thereafter being turnable out of alignment with said slot to secure the vane to its supporting structure.

15. A snow plow comprising:
an upstanding wall disposed generally transversely of
the direction of travel,
impeller means mounted forwardly of said wall for
throwing snow upwardly along the front face of said
wall,
a plurality of horizontally spaced vanes for receiving
and directing the snow thrown upwardly by said im-
peller means away from said plow,
supporting structure on the plow supporting said vanes,
and
attachment means for mounting said vanes on said sup-
porting structure,
said attachment means comprising a slot in said sup-
porting structure,
and a detent carried by said vane and insertable through
said slot, said detent being adapted after being in-
serted through said slot to secure the vane to its sup-
porting structure.

16. A snow plow comprising:
an upstanding wall disposed generally transversely of
the direction of travel,
impeller means mounted forwardly of said wall for
throwing snow upwardly along the front face of said
wall,
a plurality of horizontally spaced vanes for receiving
and directing the snow thrown upwardly by said im-
peller means away from said plow,
the lower ends of said vanes being attached to the up-
per end of said wall by first attachment means,
said first attachment means comprising a vertical slot
formed in said wall, and a detent carried by the vane
and extending rearwardly therefrom, said detent be-
ing insertable through said slot and adapted after be-
ing so inserted to secure the lower end of the vane
to said wall,
and a transversely disposed shiftable member attached
to the upper ends of the vanes by second attachment
means for varying the deflecting attitude of said vanes
in response to shifting of said member,
said second attachment means comprising a horizontal
slot in said member, and a vertical detent attached
to the upper end of the vane and extending rear-
wardly therefrom, said detent being insertable through
said slot and thereafter turnable out of alignment
with said slot to secure the upper end of the vane
to said member.

17. A snow plow comprising:
a housing including an upstanding rear wall and side
walls extending forwardly thereof,
paddle means rotatably mounted between said side walls
for throwing snow rearwardly and upwardly along
the front face of said rear wall,
a plurality of horizontally spaced flexible vanes having
the lower ends thereof secured to the upper end por-
tion of said wall and defining forwardly open chute
structure,
a motor for driving said paddle means,
an elongate transversely disposed longitudinally shift-
able vane adjusting member attached to the upper
ends of said vanes and adapted to vary the snow di-
recting attitude of said vanes in response to said
longitudinal shifting thereof,
a holding member mounted on said adjusting member
and vertically adjustable relative thereto,
said holding member having a plurality of laterally
spaced openings formed therein,
fixed stop means for selectively engaging said openings
and thereby holding said holding member against
lateral movement,
resilient means biasing said holding members towards,
and holding the openings thereof in engagement with

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said stop means, and handle means for steering and
manipulating said plow.

18. A snow plow comprising:
a housing having a curved bottom, spaced side walls,
and an upstanding backwall curved adjacent said
bottom member so as to provide smooth continu-
ous surface therewith, a balanced paddle rotatably
mounted between said side walls, with the outer
edges thereof in close proximity to said bottom mem-
ber and the curved portion of said backwall, power
means for rapidly rotating said paddle,
a plurality of upstanding flexible vanes attached at their
lower ends to the upper portion of said backwall in
spaced perpendicular relationship therewith,
control means for laterally deflecting the upper ends
of said vanes,
said control means being selectively adjustable to per-
mit a variation in the extent of said deflection in ei-
ther lateral direction,
said control means including a laterally movable elon-
gate member loosely attached to the upper end of
each vane and a guide member attached to said elon-
gate member for holding said elongate member in a
plurality of predetermined positions,
said guide member being provided with a plurality of
laterally spaced openings,
fixed stop means attached to said housing,
and resilient means for holding a selected one of said
openings in engagement with said stop means.

19. A snow plow comprising:
an upstanding rear wall means generally transverse of
the normal direction of travel,
impeller means mounted forwardly of said wall means
for rotation about a horizontal transverse axis for
throwing snow rearwardly and upwardly along a
front face of said wall means,
a plurality of generally vertically disposed horizontally
spaced vanes defining with said rear wall means a
plurality of forwardly open chute means,
said chute means being in close relationship with the
impeller means and directly receiving snow into the
chute means and discharging snow therefrom up-
wardly from substantially the entire forward verti-
cal length of the open chute means,
and means for varying the snow directing attitude of
said vanes.

20. The snow plow of claim 19,
wherein said rear wall means curves downwardly and
forwardly at its lower end and terminates in a sub-
stantially horizontal leading edge portion, the bot-
tom surface of which is contiguous with and substi-
tutially parallel to the surface to be plowed in normal
operative position, the upper end portion of said rear
wall means being inclined forwardly in said position.

21. The snow plow of claim 20, wherein at least a por-
tion of said vanes overlap the vertical center line of the
axis of rotation of said impeller means when the bottom
surface of said leading edge portion is contiguous with
and substantially parallel to the surface to be plowed in
normal operative position.

22. The snow plow of claim 19, wherein said vanes are
flexible.

23. The snow plow of claim 19, wherein only the rear
edge portions of said vanes are supported, and wherein
said vanes are supported only by said rear wall means.

24. The snow plow of claim 19, wherein said means
are flexible and supported only at the rear edge portions
thereof.

25. The snow plow of claim 19, wherein said chute
means have an upwardly facing open top upper end por-
tion from which said upwardly thrown snow is discharged.

26. The snow plow of claim 19, wherein said means
for varying the snow directing attitude of said vanes
moves the vanes relative to said impeller means and se-
lectively varies the snow deflecting vertical position of

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said vanes whereby the snow can be selectively directed forwardly or to either side of said plow.

27. The snow plow of claim 19, wherein said vanes are attached to said rear wall means, said means for varying the attitude of said vanes including a member attached to said vanes and shiftable transversely of the direction of travel, said shifting movement of said member changing the snow directing attitude of said vanes.

28. The snow plow of claim 19, wherein said vanes are flexible and only the rear edge portions thereof are supported, said vanes being of such flexibility that they are capable of back and forth lateral flexing about a generally vertical axis as the snow passes therebetween, said flexibility substantially minimizing clogging of said chute means.

29. The snow plow of claim 19, including motor means on the plow for driving said impeller means, and a pair of handles for steering and manipulating said plow,

the grip portions of said handles being spaced apart longitudinally of said plow such that when one handle is grasped by one hand and the other handle is grasped by the other hand, the plow can be swung in a manner similar to a conventional hand shovel, the forwardmost grip portion being so positioned with respect to the center of gravity of said plow that when the plow is lifted thereby, the plow substantially assumes the proper plowing attitude.

30. The snow plow of claim 19, including motor means on the plow for driving said impeller means, and located directly behind said rear wall means, and a pair of handles for steering and manipulating said plow,

the grip portions of said handles being spaced apart longitudinally of said plow such that when one handle is grasped by one hand and the other handle is grasped by the other hand, the plow can be swung in a manner similar to a conventional hand shovel, the lower end portion of said rear wall means terminating in a leading edge portion, the portion surface of which is contiguous with and substantially parallel to the surface being plowed when the plow is in normal proper plowing attitude, the forwardmost grip portion being disposed substantially directly above said motor means when said plow is in said normal proper plowing attitude.

31. The snow plow of claim 19, including motor means on the plow for driving said impeller means, and a pair of handles for steering and manipulating said plow,

the grip portions of said handles being spaced apart longitudinally of said plow such that when one handle is grasped by one hand and the other handle is grasped by the other hand, the plow can be swung in a manner similar to a conventional hand shovel, both of said handles comprising generally U-shaped members, the bight portions of which constitute the grip portions thereof,

the legs of at least one of said members extending forwardly in spaced apart relationship and connected to opposite end portions of said rear wall means, said motor means being substantially entirely disposed within the vertical longitudinal limits defined by said forwardly extending leg portions.

32. The snow plow of claim 31, including housing means including said rear wall means and side walls extending forwardly of said rear wall means and confining said impeller means therebetween, a U-shaped supporting bracket attached to said housing and enclosing said rear wall means and side walls thereof,

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the side wall portion of said bracket supporting said impeller means, the rear wall portion of said bracket supporting said motor means, neither of said handles being directly connected to said bracket.

33. The snow plow of claim 19, including a pair of handles for steering and manipulating said plow, the grip portions of said handles being spaced apart longitudinally of said plow such that when one handle is grasped by one hand and the other handle is grasped by the other hand, the plow can be swung in a manner similar to a conventional hand shovel, both of said grip portions being transversely oriented.

34. The snow plow of claim 19, wherein said impeller means includes a rotatable shaft on which are mounted only two paddles extending in opposite directions from said shaft.

35. The snow plow of claim 19, wherein said impeller means includes a shaft rotatable about a horizontal transverse axis, and paddles rigidly attached to said shaft,

36. The snow plow of claim 19, including side walls extending forwardly from said rear wall means and supporting said impeller means which is disposed therebetween, and handle means for steering and manipulating said plow,

37. The snow plow of claim 19, wherein said impeller means includes uniplanar paddles for throwing snow upwardly along the front face of said rear wall means, said paddles being of substantially rigid construction and statically straight, but having some inherent flexibility such that they free-form into a natural backward curve dynamically.

38. The snow plow of claim 19, including side walls extending forwardly from said rear wall means, said impeller means being disposed between said side walls, handle means extending rearwardly from said rear wall means for steering and manipulating said plow, said side walls having leading edges adapted to support and maintain said plow in a substantially upright inoperative position while unattended.

39. The snow plow of claim 19, including a housing which includes said rear wall means and side walls extending forwardly therefrom and enclosing said impeller means therebetween, said rear wall means curving downwardly and forwardly at its lower end and terminating in a leading edge portion which is contiguous with and substantially parallel to the surface being plowed in normal operative position,

40. The snow plow of claim 19, including the upper end portion of said rear wall means defining said open chute means being inclined forwardly in said position,

41. The snow plow of claim 19, including motor means for driving said impeller means located directly behind said rear wall means,

42. The snow plow of claim 19, including a pair of handles connected with said housing for steering and manipulating said plow,

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one of said handles comprising a generally U-shaped member, the legs of which extend forwardly in spaced apart relationship and are connected to opposite end portions of said housing,
 5 said motor means being substantially entirely disposed within the vertical longitudinal limits defined by said forwardly extending legs,
 the other of said handles also being a generally U-shaped member the legs of which are attached to the legs of said first described handle,
 10 the bight portions of said handle members constituting the grip portions thereof,
 both of said grip portions being transversely oriented, said grip portions being spaced apart longitudinally of
 15 said plow such that when one is grasped by one hand and the other is grasped by the other hand, the plow can be swung in a manner similar to a conventional hand shovel,
 the forwardmost grip portion being so positioned with respect to the center of gravity of said plow that
 20 when the plow is lifted thereby, the plow substantially assumes the proper plowing attitude,
 said chute means having an upwardly facing open top upper end portion from which said upwardly thrown snow is discharged.
 40. The snow plow of claim 19,
 wherein said rear wall means curves downwardly and forwardly at its lower end and terminates in a substantially horizontal leading edge portion, the bottom surface of which is contiguous with and substantially parallel to the surface to be plowed in normal operative position,
 the upper end portion of said rear wall means defining
 45 said open chute means being inclined forwardly in said position,
 said vanes being capable of selectively assuming snow deflecting positions in which the snow is thrown directly forwardly or to either side of said plow,
 said vanes, when positioned to throw to either side of said plow, being curved along the vertical length thereof.
 41. A powered manually operable snow plow comprising:
 a forwardly located housing which includes an upstanding wall disposed generally transversely of the direction of travel and impeller means disposed

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forwardly of said wall for throwing snow upwardly along the front face of said wall,
 motor means for driving said impeller means,
 5 and a pair of handles connected with said housing to facilitate two handed use of the plow in a manner similar to the use of a conventional two-handed shovel, the grip portion of said handles being spaced a substantial distance apart longitudinally of said plow,
 10 both of said handles having transversely oriented manual grip portions,
 both of said handles being generally U-shaped members, with the bight portions thereof constituting said transversely oriented manual grip portions,
 the legs of one of said handles being connected to the legs of the other of said handles.

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ANTONIO F. GUIDA, Primary Examiner.

ABRAHAM G. STONE, Examiner.

R. L. HOLLISTER, Assistant Examiner.